Space Weather Technical Forecast

Issued on Saturday, 06 April 2024 at 13:06 Local

This technical forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: No significant activity forecast.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Low with a peak flare of C2.0 flare observed at 05/1307UTC from the vicinity of AR3630. There are six sunspot regions on the visible disc. AR3629, is marginally the most complex on the disk, with recent slight growth in areal extent. The large region in the northeast remains simple and inactive. A new region has rotated onto the southeast of the disk but appears simple at present. All other regions are small and simple.

No Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: Solar wind speeds, as observed by DSCOVR, were steady until 06/0145UTC, when a suspected minor transient increased speeds from around 410km/s to around 450 km/s. Density remained Average. Total magnetic field strength was mostly Weak, with brief periods of Moderate between 06/0000-0400UTC, and a peak of 9nT observed at 06/0215UTC. The north-south component remained weak but mostly negative throughout, varying between +5/-8. Phi angle was almost entirely negative (towards the Sun). Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: High energy proton flux (greater than 10MeV) observed at GOES-18 was at background. High energy electron flux (greater than 2MeV) observed at GOES-16 was mostly at background with a diurnal peak at Moderate on 05 Apr, with a peak of 423pfu observed 05/0423 UTC. The associated 24-hour fluence remained well below the Active (1e8 integrated flux) threshold, with a value of 6.69e6 integrated pfu at 06/0000UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Very Low activity is expected through the period, with a slight chance of isolated M-class flaring.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs have been observed. Solar wind speeds are slightly elevated at between 400-460km/s, from waning high speed stream and weak transients, and should generally decline. The next enhancement is coronal hole 20, this most probably connecting on 08 Apr.

Geomagnetic activity is forecast to be mainly Quiet to Unsettled through 06 Apr, but with a decreasing chance of Unsettled intervals into 07 Apr. There may be a further risk of Unsettled to Active intervals and a slight chance of G1/Minor geomagnetic storms on 08 and 09 Apr due to the connection to coronal hole 20.

Energetic Particles / Solar Radiation: High energy proton flux as observed by GOES-18, is expected to remain at background. High energy electron flux at GOES-16 is likely to oscillate between background and moderate levels through the next four days. Electron fluence values are expected to remain below the Active threshold.

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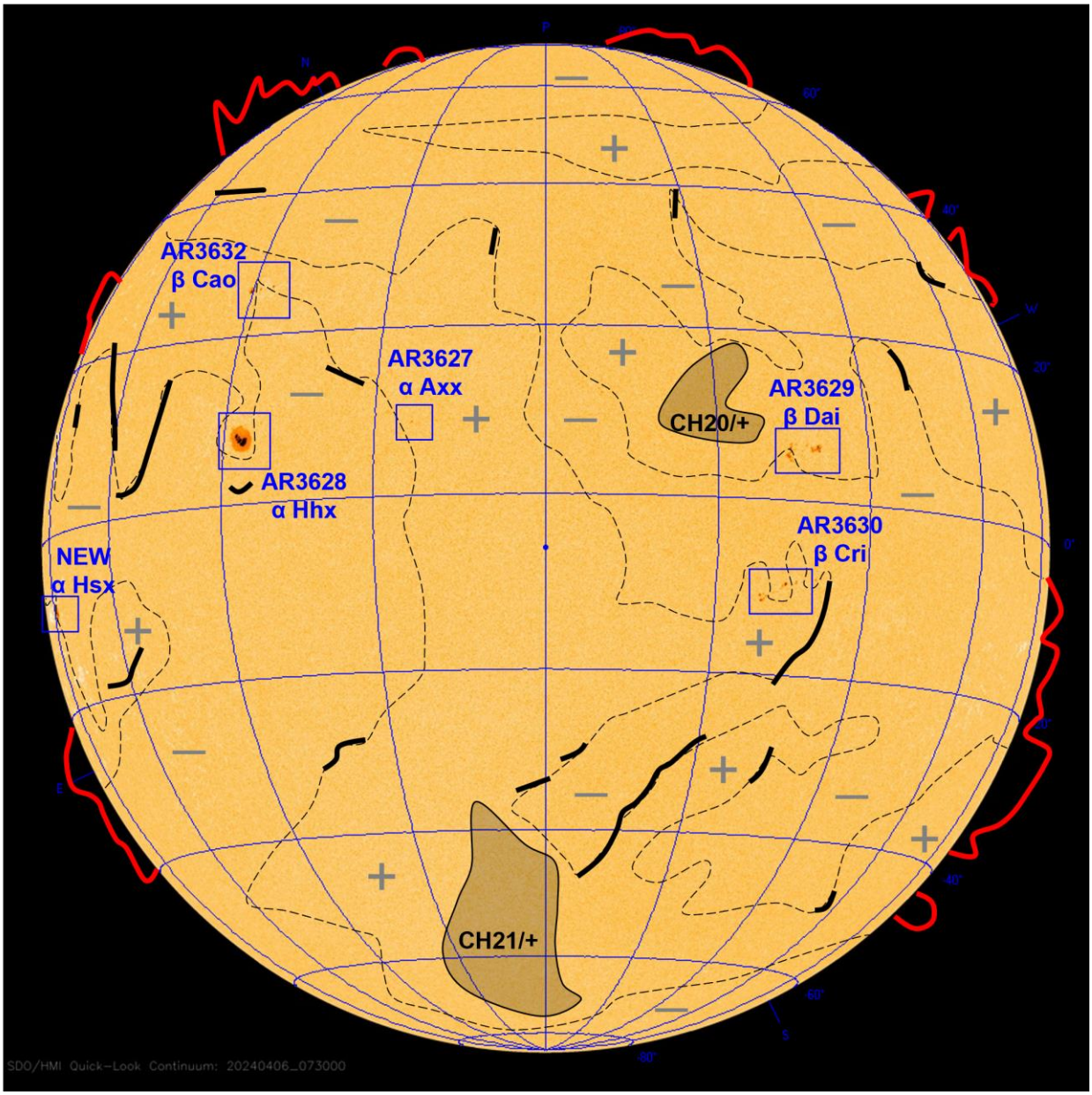
Figure 1. Solar Analysis Valid 06/0800 UTC.



Key: Filament ___ , Prominence ___ , Magnetic Field Line - - - , Polarity +/-, Coronal Holes: Grey shaded area CHxx +/-, Sunspot groups 25xx - Mt Wilson α-β-βγ-βγδ and Zurich-McIntosh Axx etc.

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Geomagnetic Storms:

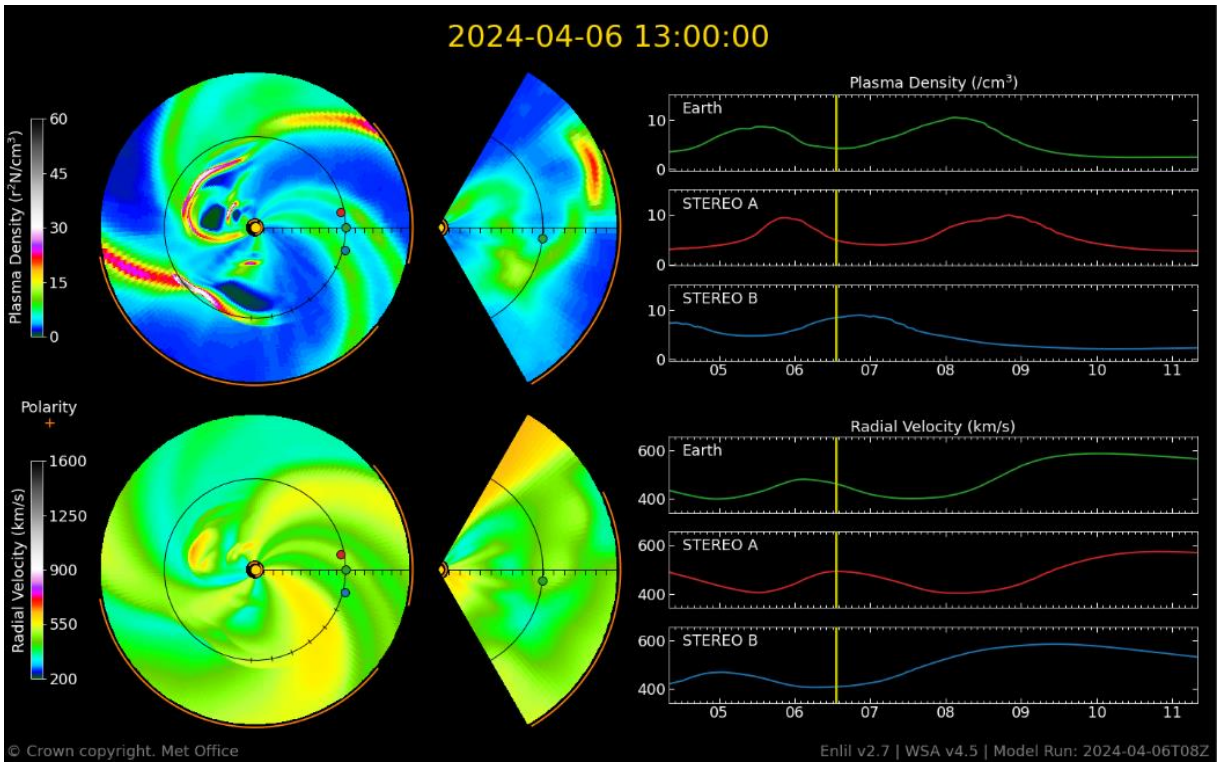
No Earth-directed CMEs have been observed.

Solar wind speeds are slightly elevated at between 400-460km/s, from waning high speed stream and weak transients, and should generally decline. The next enhancement is coronal hole 20, in northwest, this most probably connecting on 08 Apr, but this a weak, recently developed feature with uncertainty in potential connection and strength of any high speed stream.

Geomagnetic activity is forecast to be mainly Quiet to Unsettled through 06 Apr, but with a decreasing chance of Unsettled intervals into 07 Apr. There may be a further risk of Unsettled to Active intervals and a slight chance of G1/Minor geomagnetic storms on 08 and 09 Apr due to the uncertain connection to coronal hole 20.

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Figure 2: MOSWOC ENLIL



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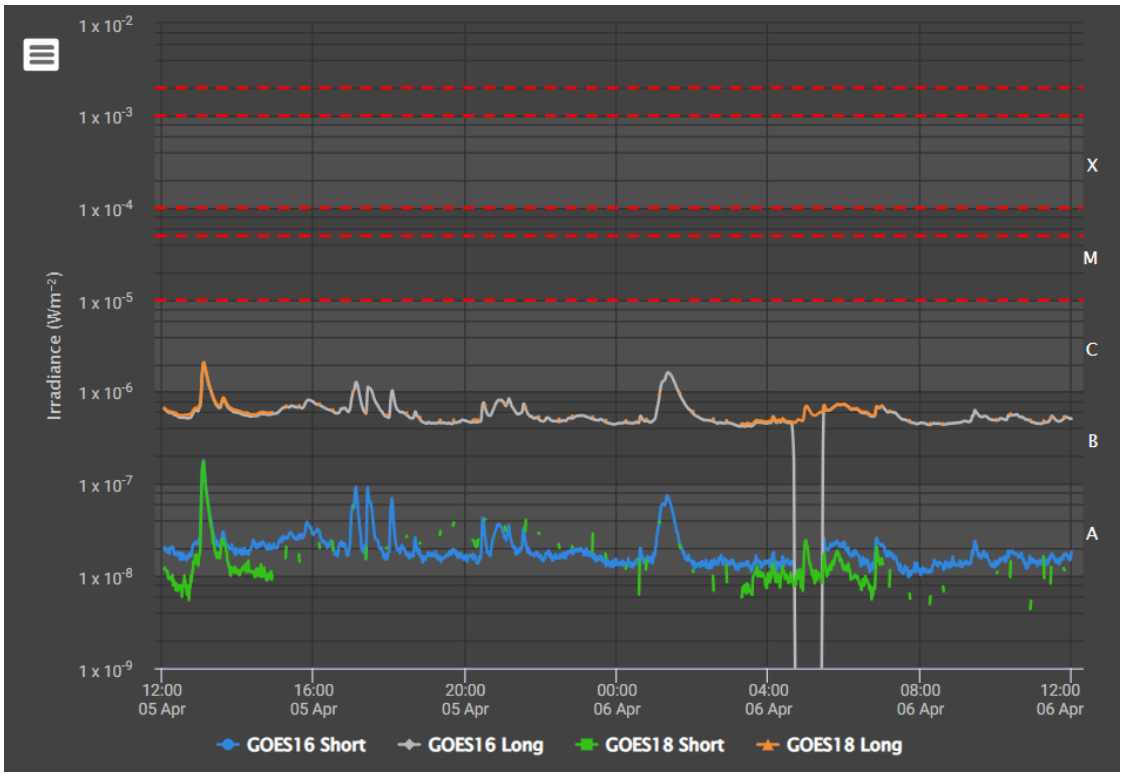
Radio Blackouts - X-Ray Flares:

Low activity is expected, with a likelihood of further C-flares and a slight chance of an isolated M-class flare. These are possible from the developing regions on the disc, or from new regions likely to rotate onto visible solar disc.

There are six sunspot regions on the visible disc. AR3629, is marginally the most complex on the disk, with recent slight growth in areal extent. The large region in the northeast remains simple and inactive. A new region has rotated onto the southeast of the disk but appears simple at present. All other regions are small and simple.

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X Class	No	1	1	1	1

Figure 3: 24 hour X-Ray trace.



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Solar Radiation Storms - (High Energy Protons):

High energy proton flux as observed by GOES-18 is at background levels. This is expected to remain so, with none of the visible active regions currently expected to bring a risk of significant proton rich flares.

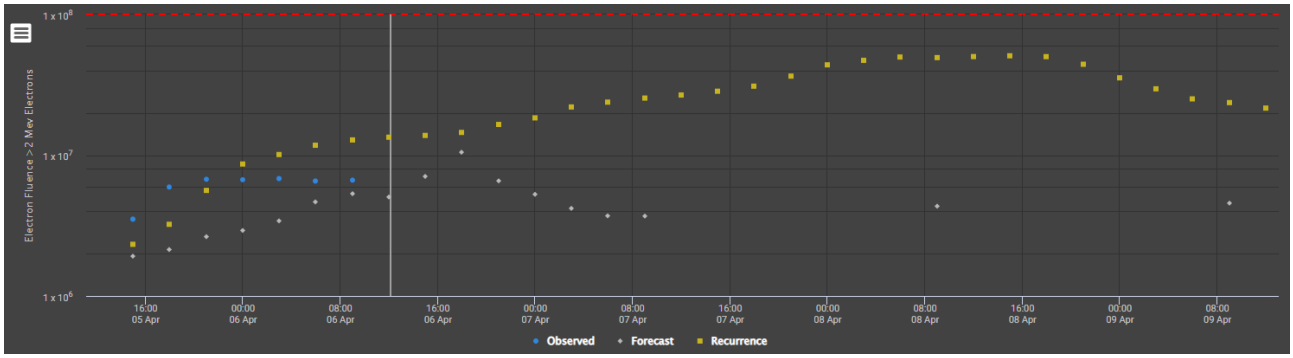
Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	1	1	1	1
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

High Energy Electrons Event (≥ 2MeV):

High energy electron flux at GOES-16 is likely to oscillate between background and moderate levels through the next four days, due to the effects of the declining coronal hole high speed stream.
Electron fluence values are expected to remain below the Active threshold.

GEO Electron Environment Probability (Exceedance)	Level (cm^{-2} sr^{-1} day^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ 2 MeV ≥ $1x10^8$**	No	1	1	1	1
Very Active	**≥ 2 MeV ≥ $1x10^9$**	No	1	1	1	1

Figure 5: MOSWOC REFM observed/forecast/recurrant fluence.



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